

#### ATLAS RC Note

**ARN 5-02** 

# Comments on revised ATLAS C&I Cost Estimates 2002 - 2005

#### Introduction

Following the request of the RRB Scrutiny Group (SG) in June 2001, ATLAS submitted to SG its M&O and C&I (A, B, C) cost estimates 2002 – 2007 in August further scrutiny. The results of the partial scrutiny of C&I (A) were presented in the October 2001.

This document provides comments and clarifications to the updated C&I cost estimates 2002 – 2005 (with a time frame up to 2010) submitted to the joint LHCC-RRB SG in February, 2002.

#### Methodology

The methodology used to collect the C&I cost estimates is summarized in Table 1:

### Table 1. Methodology

| # | Step  |
|---|---|
| 1 | Update the cost estimates from October 2001 by            |
|   | systems using the original template                       |
| 2 | For C&I (A), use the original template (M&O (A))          |
| 3 | For C&I (B), use the new template and guidelines          |
|   | provided by SG, using a "transformation matrix" to        |
|   | ensure a homogenous approach to cost item recording       |
|   | across the different systems (Appendix 1)                 |
| 4 | Collect plans on Institute technical manpower to be       |
|   | sent to CERN for installation and integration activities; |
|   | identify what share is expected to be offered by          |
|   | Funding Agencies as in-kind contributions                 |

## Comments on revised ATLAS C&I Cost Estimates 2002 - 2005 (Cont'd)

### **Assumptions**

The assumptions made while providing the updated cost estimates are summarized in Table 2:

Table 2. Assumptions

| # | Assumption  |
|---|---|
| 1 | The initial ATLAS detector is ready for physics data    |
|   | taking by April 2006                                    |
| 2 | Institute technical manpower includes technicians (and  |
|   | possibly engineers) send to CERN for maintaining the    |
|   | respective systems, not accounted for by Funding        |
|   | Agencies as contributions to C&I                        |
| 3 | Hired manpower includes industrial personnel hired      |
|   | locally at CERN or institute personnel offered by       |
|   | Funding Agencies as in-kind contributions to C&I        |
| 4 | The recognized value of a technician is 80 kCHF/year    |
|   | and for a qualified engineer (e.g. systems manager) 120 |
|   | kCHF/year   |
| 5 | Institute manpower originally planned for installation  |
|   | and integration work at CERN (and contained within      |
|   | the recognized integrated manpower effort of 5 315      |
|   | man-years) is not part of hired institute manpower      |

**C&I (A)** The following comments and clarifications are made to the

The following comments and clarifications are made to the collected C&I (A) cost estimates (Table 3):

Table 3. Comments, clarifications to C&I (A)

| # | Comment  |
|---|--|
| 1 | Magnet integration in B180 and in Pit 1: Estimates   |
|   | given by D Schinzel/F Haug                           |
| 2 | Detector integration work: design work for final     |
|   | configuration control and services integration       |
| 3 | General technical support: Operation of the traction |
|   | system, cooling plant and TDAQ                       |
| 4 | Heavy transport: Moving of magnet and detector       |
|   | elements to the pit                                  |
| 5 | Crane drivers: 2-5 crane drives needed to operate 7  |
|   | cranes in Pit 1                                      |

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# Comments on revised ATLAS C&I Cost Estimates 2002 - 2005 (Cont'd)

#### C&I (B)

The revised C&I (B) cost estimates are provided using the new template. Appendix 1 shows the guidelines used to translate the previous cost estimates from the original template.

Despite trying to ensure a homogenous approach across the different ATLAS systems, a number of apparent inconsistencies remained in the draft figures submitted to SG in early February. Revised cost estimates, as well as additional clarifications, are attached to this document.

These comments or corrections are summarized in Table 4:

Table 4. Comments, clarifications to C&I (B)

| # | Comment  |
|---|--|
| 1 | ID: a. Assumptions related to the cost and use of NMR probes have been clarified b. Technical manpower from institutes originally included physicists. They have been removed from the revised figures c. Communications costs added 5kCHF/y to be consistent with other systems |
| 2 | LAr: a. Hired manpower has increased in 2002 and 2003 due to agreed transfer of resources from the CORE construction budget to C&I (ca. 300 kCHF in 2002) b. Heavy transport (200 kCHF in 2004) moved to C&I (A)   |
| 3 | TileCal: a. Revision of C&I estimates in line w.r.t supplementary costs, in order to avoid double-counting b. See separate note on cost drivers  |
| 4 | Muons: a. Revision of C&I estimates to clearly separate M&O activities (unclear allocations of TB electronics, gas & cooling expenses) b. Communications costs added 5kCHF/y to be consistent with other systems   |

# **Comments on revised ATLAS C&I Cost Estimates**

**2002 - 2005** (Cont'd)

### **Conclusions**

The following conclusions are made (Table 5):

Table 5. Conclusions

| # | Conclusion  |
|---|---|
| 1 | Comments and corrections are made to the C&I tables |
|   | submitted to LHCC-RRB SG for further scrutiny       |

| PERIMENT: ATLAS                     |      |       |        |      |       | New C    | &I(B) f  | ormat   |       |       |       |      |       |         |
|-------------------------------------|------|-------|--------|------|-------|----------|----------|---------|-------|-------|-------|------|-------|---------|
| Previous C&I(B) format              | Mech | Gas-s | Cryo-s | Cool | FE-el | Std-e-PS | Std-e-Cr | Std-e-R | Ctrls | Sub-d | Areas | Comm | Store | Hire-mp |
| Detector related costs              |      |       |        |      |       |          |          |         |       |       |       |      |       |         |
| Power supply                        |      |       |        |      |       | X        |          |         |       |       |       |      |       |         |
| Gas systems                         |      | X     |        |      |       |          |          |         |       |       |       |      |       | X       |
| Gas consumption                     |      | X     |        |      |       |          |          |         |       |       |       |      |       |         |
| Cooling systems                     |      |       |        | X    |       |          |          |         |       |       |       |      |       | X       |
| Cooling fluids(above –50°C)         |      |       |        | X    |       |          |          |         |       |       |       |      |       |         |
| Cryogenic fluids (below –50°C)      |      |       | X      |      |       |          |          |         |       |       |       |      |       |         |
| Moving/hydraulic systems            | X    |       |        |      |       |          |          |         |       |       |       |      |       | X       |
| Detector (re-)integration & survey  | X    |       |        |      |       |          |          |         |       |       |       |      |       |         |
| General Technical support           | X    |       |        |      |       |          |          |         |       |       |       |      | X     | X       |
| UPS maintenance                     |      |       |        |      |       | X        |          |         |       |       |       |      |       |         |
| Electronics pool rentals            |      |       |        |      |       |          | X        |         |       |       |       |      |       |         |
| Counting & control rooms            |      |       |        |      |       |          |          |         | X     |       |       |      |       |         |
| Communications                      |      |       |        |      |       |          |          |         |       |       |       |      |       |         |
| GSM phones                          |      |       |        |      |       |          |          |         |       |       |       | X    |       | X       |
| On-line computing                   |      |       |        |      |       |          |          |         |       |       |       |      |       |         |
| System management                   |      |       |        |      |       |          |          |         |       |       |       |      |       | X       |
| Detector controls                   |      |       |        |      |       |          |          |         | X     |       |       |      |       |         |
| Computers/processors/LANs           |      |       |        |      |       |          |          | X       |       |       |       |      |       |         |
| Software licenses                   |      |       |        |      |       |          |          | X       |       |       |       |      |       |         |
| Laboratory operations               |      |       |        |      |       |          |          |         |       |       |       |      |       |         |
| Assembly areas, clean rooms, active |      |       |        |      |       |          |          |         |       |       |       |      |       |         |
| storage areas                       |      |       |        |      |       |          |          |         |       |       | X     |      |       |         |
| Workshops                           |      |       |        |      |       |          |          |         |       |       | X     |      |       | X       |
| Laboratory instruments              |      |       |        |      |       |          | X        |         |       |       |       |      |       |         |
| Electronics pool rentals            |      |       |        |      |       |          | X        |         |       |       |       |      |       |         |
| General services                    |      |       |        |      |       |          |          |         |       |       |       |      |       |         |
| Cranes                              |      |       |        |      |       |          |          |         |       |       |       |      |       | X       |
| Heavy transport                     | X    |       |        |      |       |          |          |         |       |       |       |      |       |         |
| Survey                              | x    |       |        |      |       |          |          |         |       |       |       |      |       | X       |
| Consultancy                         |      |       |        |      |       |          |          |         |       |       |       |      |       |         |
| Engineering                         |      |       |        |      |       |          |          |         |       |       |       |      |       | X       |

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M&O Cost Estimates in kCHF

ATLAS C&I (A) ESTIMATES (kCHF)

M=Maintenance/Repairs

O=Operations

C=Consumables

| EP-ATO/mn/080302               |      |   | 2002 | 2003  | 2004  | 2005  | 2006 | 2007 | TOTAL | Notes |
|--------------------------------|------|---|------|-------|-------|-------|------|------|-------|-------|
| Detector related costs         | Туре |   | 665  | 1,870 | 2,885 | 1,965 | 0    | 0    | 7,385 |       |
|                                |      |   |      |       |       |       |      |      |       |       |
| Magnet                         | _A   | O | 60   | 60    | 60    | 0     | 0    | 0    | 180   |       |
|                                | _A   | C | 25   | 25    | 25    | 0     | 0    | 0    |       |       |
| Magnet controls                | _A   | O | 150  | 150   | 150   | 0     | 0    | 0    | 450   |       |
|                                | _A   | C | 30   | 45    | 50    | 0     | 0    | 0    | 125   |       |
| Magnet power supply            | A    | O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
|                                | A    | C | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
| Gas systems                    | A    | O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
|                                | A    | C | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
| Gas consumption                | A    | O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
|                                | A    | C | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
| Cooling systems                | _A   | O | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
|                                | _A   | C | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
| Cooling fluids(above –50°C)    | _A   | O | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
|                                | _A   | C | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
| External cryogenics            | A    | O | 0    | 640   | 1,060 | 400   | 0    | 0    | 2,100 |       |
|                                | A    | C | 0    | 350   | 495   | 110   | 0    | 0    | 955   |       |
| Cryogenic fluids (below –50°C) | A    | O |      |       |       |       |      |      | 0     |       |
|                                | _A   | C |      |       |       |       |      |      | 0     |       |
| Moving/hydraulic systems       | _A   | O |      |       |       |       |      |      | 0     |       |
|                                | A    | C |      |       |       |       |      |      | 0     |       |
| Detector safety systems        | _A   | O |      |       |       |       |      |      | 0     |       |
|                                | A    | C |      |       |       |       |      |      | 0     |       |
| Shutdown activities            | A    | O |      |       |       |       |      |      | 0     |       |
|                                | A    | C |      |       |       |       |      |      | 0     |       |
| Detector (re-)integration &    | A    | O | 200  | 300   | 500   | 500   | 0    | 0    | 1,500 |       |
| survey                         | _    |   |      |       |       |       |      |      |       |       |
|                                | _A   | C | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
| General Technical support      | _A   | O | 160  | 240   | 320   | 320   | 0    | 0    | ,     |       |
|                                | _A   | C | 40   | 60    | 225   | 635   | 0    | 0    |       |       |
| UPS maintenance                | _A   | O | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
|                                | _A   | C | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
| Electronics pool rentals       | _A   | O | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
|                                | _A   | C | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
| Beam pipe & vacuum             | _A   | O | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
|                                | _A   | C | 0    | 0     | 0     | 0     | 0    | 0    |       |       |
| Counting & control rooms       | _A   | O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
| -                              | _A   | C | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
| Secretariat                    | Tuna |   | 0    | 0     | 0     | 0     | 0    | 0    | 0     | ī     |
| Beereiariai                    | Туре |   | 0    | U     |       | U     |      | - 0  |       | 1     |
| Secretarial assistance         | A    | O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
|                                | A    | C | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
| Economat                       | A    | O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
|                                | A    | C | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |
| Fax, photocopiers, printers    | _A   | O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |       |

| Printing and publication   |                                    | _A   | C | 0  | 0   | 0   | 0 | 0 | 0 | 0   |                       |
|--|------------------------------------|------|---|----|-----|-----|---|---|---|-----|-----------------------|
| GSM phones; on-call service  | Printing and publication           | _    |   |    |     |     |   |   |   |     |                       |
| A  | Communications                     | Туре |   | 0  | 0   | 0   | 0 | 0 | 0 | 0   | I                     |
| Automatic call-back  | GSM phones; on-call service        | _    |   |    |     |     |   |   |   |     |                       |
| A C   On-line computing   Type   30 30 30 0 0 0 90                             | Automatic call-back                | _    |   |    |     |     |   |   |   |     |                       |
| System management  | Tationalic can back                | _    |   |    |     |     |   |   |   |     |                       |
| System management  | On-line computing                  | Туре |   | 30 | 30  | 30  | 0 | 0 | 0 |     | _                     |
| Data storage, (temporary on disk) A  | System management                  | A    | O |    |     |     |   |   |   |     |                       |
| A  |                                    | _    |   |    |     |     |   |   |   |     |                       |
| Detector controls  | Data storage, (temporary on disk)  | ) A  | О |    |     |     |   |   |   | 0   |                       |
| Computers/processors/LANs  |                                    | A    | C |    |     |     |   |   |   | 0   |                       |
| Computers/processors/LANs  | Detector controls                  | _    |   |    |     |     |   |   |   |     |                       |
| Software licenses  |                                    | _    |   |    |     |     |   |   |   |     |                       |
| Software licenses  | Computers/processors/LANs          | _    |   |    |     |     |   |   |   |     |                       |
| A C   O   O   O   O   O   O   O   O   O  | Software licenses                  | _    |   |    |     |     |   |   |   |     |                       |
| A C 30 30 30 0 0 0 90  | Software needses                   | _    |   |    |     |     |   |   |   |     |                       |
| Test beams, calibration facilities Type  | Common desktop infrastructure      | _    |   |    |     |     |   |   |   |     |                       |
| General operation  |                                    | A    | C | 30 | 30  | 30  | 0 | 0 | 0 | 90  |                       |
| A C  | Test beams, calibration facilities | Туре |   | 50 | 485 | 250 | 0 | 0 | 0 | 785 |                       |
| A C  | General operation                  | A    | O | 0  | 0   | 0   | 0 | 0 | 0 | 0   |                       |
| A C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |                                    | A    | C | 0  | 0   | 0   | 0 | 0 | 0 | 0   |                       |
| A  | Common electronics                 | A    | O | 0  | 0   | 0   | 0 | 0 | 0 | 0   |                       |
| A C  |                                    | _    |   |    |     |     |   |   |   |     |                       |
| A  | Electronics pool rentals           | _    |   |    |     |     |   |   |   |     |                       |
| A C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | <u> </u>                           | _    |   |    |     |     |   |   |   |     |                       |
| A  | Gas systems                        | _    |   |    |     |     |   |   |   |     |                       |
| A C 0 0 0 0 0 0 0 0 0 0  | Gas consumption                    | _    |   |    |     |     |   |   |   |     |                       |
| External cryogenics  | Cus consumption                    | _    |   |    |     |     |   |   |   |     |                       |
| A C 50 220 150 0 0 0 420    Laboratory operations   Type                       | External cryogenics                | _    |   |    |     |     |   |   |   |     | Hall 180. Data from D |
| Assembly areas, clean rooms, A O 0 active storage areas  A C 0 Workshops A O 0 |                                    | A    | C | 50 | 220 | 150 | 0 | 0 | 0 | 420 |                       |
| A C 0 0 Workshops A O 0  | Laboratory operations              | Туре |   | 0  | 0   | 0   | 0 | 0 | 0 | 0   | I                     |
| A C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | •                                  | A    | О |    |     |     |   |   |   | 0   |                       |
| Workshops A O  | active storage areas               |      | C |    |     |     |   |   |   | _   |                       |
|  | Workshops                          | _    |   |    |     |     |   |   |   |     |                       |
|  | w or venops                        | _    |   |    |     |     |   |   |   |     |                       |

| Laboratory instruments        | _<br>A | O |     |       |       |       |   |   | 0      |
|-------------------------------|--------|---|-----|-------|-------|-------|---|---|--------|
|                               | _A     | C |     |       |       |       |   |   | 0      |
| General services              | Туре   |   | 120 | 390   | 740   | 550   | 0 | 0 | 1,800  |
| Cooling & ventilation         | _<br>A | O |     |       |       |       |   |   | 0      |
|                               | A      | C |     |       |       |       |   |   | 0      |
| Power                         | A      | O |     |       |       |       |   |   | 0      |
|                               | A      | C |     |       |       |       |   |   | 0      |
| Power distribution system     | A      | O |     |       |       |       |   |   | 0      |
| •                             | A      | C |     |       |       |       |   |   | 0      |
| Heavy transport               | A      | O | 0   | 90    | 440   | 250   | 0 | 0 | 780    |
|                               | A      | C | 0   | 0     | 0     | 0     | 0 | 0 | 0      |
| Cranes                        | A      | O | 120 | 300   | 300   | 300   | 0 | 0 | 1,020  |
|                               | A      | C |     |       |       |       |   |   | 0      |
| Cars                          | A      | O |     |       |       |       |   |   | 0      |
|                               | A      | C |     |       |       |       |   |   | 0      |
| Cleaning                      | A      | O |     |       |       |       |   |   | 0      |
|                               | A      | C |     |       |       |       |   |   | 0      |
| Survey                        | A      | O |     |       |       |       |   |   | 0      |
| •                             | A      | C |     |       |       |       |   |   | 0      |
| Passive storage space         | A      | O |     |       |       |       |   |   | 0      |
|                               | A      | C |     |       |       |       |   |   | 0      |
| Common desktop infrastructure | A      | O |     |       |       |       |   |   | 0      |
|                               | _<br>A | C |     |       |       |       |   |   | 0      |
| Academic subsistence          | A      | O |     |       |       |       |   |   | 0      |
|                               | A      | C |     |       |       |       |   |   | 0      |
| Outreach                      | A      | O |     |       |       |       |   |   | 0      |
|                               | A      | C |     |       |       |       |   |   | 0      |
| GRAND TOTALS                  |        |   | 865 | 2,775 | 3,905 | 2,515 | 0 | 0 | 10,060 |

# M&O Cost Estimates in kCHF M=Maintenance/Repairs

#### ATLAS C&I ESTIMATES (kCHF) FOR MAGNETS

O=Operations

| O=Operations<br>EP-ATO/mn/300102             |           | 2002      | 2003      | 2004      | 2005 | 2006 | 2007 | тот         | Notes  |
|--|-----------|-----------|-----------|-----------|------|------|------|-------------|--|
| Detector related costs                       | Туре      | 265       | 1,270     | 1,840     | 510  | 0    | 0    | 3,885       |  |
| Magnet                                       | A O       | 60        | 60        | 60        |      |      |      |             | H180. Numbers from D Schinzel                                  |
| Magnet controls                              | A C O     | 25<br>150 | 25<br>150 | 25<br>150 |      |      |      |             | H180. Numbers from D Schinzel<br>H180. Numbers from D Schinzel |
| Magnet power supply                          | A C A O   | 30        | 45        | 50        |      |      |      | 125<br>0    | H180. Numbers from D Schinzel                                  |
| Gas systems                                  | A C A O   |           |           |           |      |      |      | 0           |  |
| Gas consumption                              | A C A O   |           |           |           |      |      |      | 0           |  |
| Cooling systems                              | A C A O   |           |           |           |      |      |      | 0           |  |
| Cooling fluids(above –50°C)                  | A C A O   |           |           |           |      |      |      | 0           |  |
| External cryogenics                          | A C A O   |           | 640       | 1,060     | 400  |      |      | 0           |  |
| Proximity cryogenics                         | A C A O   |           | 350       | 495       | 110  |      |      |             | Point 1.Numbers from D Schinzel.                               |
| Cryogenic fluids (below –50°C)               | A C       |           |           |           |      |      |      | 0           |  |
| Moving/hydraulic systems                     | A C A O   |           |           |           |      |      |      | 0           |  |
|  | A C       |           |           |           |      |      |      | 0           |  |
| Detector safety systems                      | A O C     |           |           |           |      |      |      | 0           |  |
| Detector-specific radiation protection       | A O       |           |           |           |      |      |      | 0           |  |
| Shutdown activities                          | A C A O C |           |           |           |      |      |      | 0<br>0<br>0 |  |
| Detector (re-)integration & survey           | A O       |           |           |           |      |      |      | 0           |  |
| General Technical support                    | A C A O   |           |           |           |      |      |      | 0           |  |
| UPS maintenance                              | A C A O   |           |           |           |      |      |      | 0           |  |
| Electronics pool rentals                     | A C A O   |           |           |           |      |      |      | 0           |  |
|  | A C A O   |           |           |           |      |      |      | 0           |  |
| Beam pipe & vacuum  Counting & control rooms | A C       |           |           |           |      |      |      | 0           |  |
| Counting & control rooms                     | A O C     |           |           |           |      |      |      | 0           |  |
| Secretariat                                  | Туре      | 0         | 0         | 0         | 0    | 0    | 0    | 0           |  |
| Secretarial assistance                       | A 0       |           |           |           |      |      |      | 0           |  |
| Economat                                     | A C A O   |           |           |           |      |      |      | 0           |  |
| Fax, photocopiers, printers                  | A C A O   |           |           |           |      |      |      | 0           |  |
| Printing and publication                     | A C A O   |           |           |           |      |      |      | 0           |  |
|  | A C       |           |           |           |      |      |      | 0           |  |
| Communications                               | Туре      | 0         | 0         | 0         | 0    | 0    | 0    | 0           |  |
| GSM phones                                   | A O C     |           |           |           |      |      |      | 0           |  |
| GSM phones                                   | B O C     |           |           |           |      |      |      | 0           |  |
| Automatic call-back                          | A O A     |           |           |           |      |      |      | 0           |  |
| Automatic call-back                          | B O C     |           |           |           |      |      |      | 0           |  |
| On-line computing                            | Туре      | 0         | 0         | 0         | 0    | 0    | 0    |             |  |
| System management                            | A 0       |           |           |           |      |      |      | 0           |  |
| Data storage, (temporary on                  | A C A O   |           |           |           |      |      |      | 0           |  |
| disk)  | A C       |           |           |           |      |      |      | 0           |  |
| Detector controls                            | A O C     |           |           |           |      |      |      | 0           |  |
| Computers/processors/LANs                    | A O C     |           |           |           |      |      |      | 0           |  |
| Software licenses                            | A O C     |           |           |           |      |      |      | 0           |  |

| Common desktop infrastructure   | - A   | 0                                       |         |            |            |   |   |   | 0   |  |
|---|---|---|---------|------------|------------|---|---|---|---|--|
|   | _A  | C                                       |         |            |            |   |   |   | 0   |  |
| Test beams, calibration facilities  | Туре  |   | 50      | 485        | 250        | 0 | 0 | 0 | 785   |  |
| General operation   | A   | 0                                       |         |            |            |   |   |   | 0   |  |
| Common electronics  | _ A<br>_ A  | C<br>0                                  |         |            |            |   |   |   | 0   |  |
| Electronics and DAQ   | _B<br>B   | C<br>0                                  |         |            |            |   |   |   | 0   |  |
| Counting & control rooms  | A   | C<br>0                                  |         |            |            |   |   |   | 0   |  |
| Gas systems   | _ A<br>_ A<br>A   | C<br>O<br>C                             |         |            |            |   |   |   | 0<br>0<br>0   |  |
| Gas consumption   | A<br>A<br>A   | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Gas systems   | B<br>B  | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Gas consumption   | _В<br>_В<br>В   | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| External cryogenics   | _ A<br>_ A  | 0<br>C                                  | 0<br>50 | 265<br>220 | 100<br>150 |   |   |   | 365   | Hall 180. Numbers from D Schinzel<br>Hall 180. Numbers from D Schinzel |
| Proximity cryogenics  | A<br>A<br>A   | 0<br>C                                  | 30      | 220        | 150        |   |   |   | 0   | rian 160. Numbers from D Schnizer                                      |
| Safety & radioprotection  | _A<br>_A<br>A   | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Irradiations  | _B<br>_B  | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Modifications   | _ B<br>_ A<br>_ A   | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Modifications   | _B<br>_B  | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Electronics pool rentals  | _ A<br>_ A  | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Electronics pool rentals  | _B<br>_B  | 0<br>C                                  |         |            |            |   |   |   | 0   |  |
| Laboratory operations   | Туре  |   | 0       | 0          | 0          | 0 | 0 | 0 | 0   |  |
| Assembly areas, clean rooms,  | _<br>A  |   |         |            |            |   |   |   |   |  |
|   | А   | O                                       |         |            |            |   |   |   | 0   |  |
| active storage areas  | _<br>_A   | C                                       |         |            |            |   |   |   | 0   |  |
|   | A<br>B  | C<br>O                                  |         |            |            |   |   |   | 0<br>0  |  |
| Assembly areas, clean rooms,  | A<br>B<br>B<br>A  | C<br>O<br>C<br>O                        |         |            |            |   |   |   | 0<br>0<br>0   |  |
| Assembly areas, clean rooms, active storage areas   | A<br>B<br>B<br>A<br>A<br>B  | C<br>O<br>C<br>O<br>C                   |         |            |            |   |   |   | 0<br>0<br>0<br>0<br>0   |  |
| Assembly areas, clean rooms, active storage areas  Workshops  | _ A<br>B<br>_ B<br>_ A<br>_ A<br>_ B<br>_ B<br>_ A  | C O C O C O C                           |         |            |            |   |   |   | 0<br>0<br>0<br>0  |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops   | _ A B _ B _ A _ B _ B _ A _ A _ B _ B _   | C O C O C O C O C O C                   |         |            |            |   |   |   | 0<br>0<br>0<br>0<br>0<br>0<br>0   |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments   | A B A A B B B A A   | C O C O C O C O C O C O C O C O C O C O |         |            |            |   |   |   | 0<br>0<br>0<br>0<br>0<br>0<br>0   |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments   | _ A B _ B _ A _ A _ B _ B _ A _ A _ B _ B   |   |         |            |            |   |   |   | 0<br>0<br>0<br>0<br>0<br>0<br>0   |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals   | _ A B _ B _ A _ A _ B _ B _ A _ A _ B _ B   | C O C O C O C O C O C O C O C           | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0   |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals   | _ A B _ B _ A A B B _ B B _ A A B B B B   | C O C O C O C O C O C O C O C O C       | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                     |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  General services  Cooling & ventilation  | A B B A A B B A A B B A A B B A A B B A A B B A A B B B A A B B B B A A A B B B A | C O C O C O C O C O C O C O C O C O C O | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power   | A B B A A B B A A B B A A B B A A B B A A B B A A B B A _ | C O C O C O C O C O C O C O C O C O C O | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  General services  Cooling & ventilation  | A B B A A B B A A   | C O C O C O C O C O C O C O C O C O C O | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  | A B A A B B A A   |   | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport   | A B B A A B B B   |   | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes   | A B B A A B B A _ |   | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars   | A B B A A B B A |   | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  General services  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars                               | A B B A A A A A   |   | 0       | 0          | 0          | 0 | 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars  Safety & radioprotection                     | A B B A A A A A   |   | 0       | 0          | 0          | 0 | 0 | 0 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars  Cars  Safety & radioprotection  INB compliance | A B B A A A A A   |   | 0       | 0          | 0          | 0 | 0 | 0 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |  |

| Elevators   | C                        | 0   |  |  |  |   |  |                          | 0  |                    |
|---|--------------------------|---|--|--|--|---|--|--------------------------|--|--------------------|
| Gerant de site  | C<br>C                   | C<br>O  |  |  |  |   |  |                          | 0  |                    |
|   | C                        | C   |  |  |  |   |  |                          | 0  |                    |
| Flood control   | C                        | O   |  |  |  |   |  |                          | 0  |                    |
| L   | C                        | C   |  |  |  |   |  |                          | 0  |                    |
| Insurance (CERN standard)   | C                        | O<br>C  |  |  |  |   |  |                          | 0  |                    |
| Cleaning  | A                        | o   |  |  |  |   |  |                          | 0  |                    |
|   | A                        | C   |  |  |  |   |  |                          | 0  |                    |
| Cleaning  | C                        | O   |  |  |  |   |  |                          | 0  |                    |
|   | C                        | C   |  |  |  |   |  |                          | 0  |                    |
| Survey  | A                        | O<br>C  |  |  |  |   |  |                          | 0  |                    |
| Survey  | B<br>B                   | 0   |  |  |  |   |  |                          | 0  |                    |
| Burvey  | В                        | Č   |  |  |  |   |  |                          | 0  |                    |
| Passive storage space   | A                        | O   |  |  |  |   |  |                          | 0  |                    |
|   | A                        | C   |  |  |  |   |  |                          | 0  |                    |
| Passive storage space   | В                        | O   |  |  |  |   |  |                          | 0  |                    |
| Common dealton infrastructura   | В                        | C   |  |  |  |   |  |                          | 0  |                    |
| Common desktop infrastructure   | A                        | O   |  |  |  |   |  |                          | 0  |                    |
|   | A                        | C   |  |  |  |   |  |                          | 0  |                    |
| Office space  | C                        | O   |  |  |  |   |  |                          | 0  |                    |
|   | С                        | C   |  |  |  |   |  |                          | 0  |                    |
| Consultancy   | Туре                     |   | 0  | 0  | 0  | 0   | 0  | 0                        | 0  |                    |
|   |                          |   |  |  |  |   |  |                          |  |                    |
| Daviawing   |                          |   |  |  |  |   |  |                          |  |                    |
| Reviewing   | A                        | O   |  |  |  |   |  |                          | 0  |                    |
|   | A                        | C   |  |  |  |   |  |                          | 0  |                    |
| Engineering   | A<br>A                   | C<br>O  |  |  |  |   |  |                          | 0  |                    |
| Engineering   | A<br>A<br>A              | C<br>O<br>C   |  |  |  |   |  |                          | 0<br>0<br>0  |                    |
|   | A<br>A                   | C<br>O  |  |  |  |   |  |                          | 0  |                    |
| Engineering Training  | A<br>A<br>A<br>A         | C<br>O<br>C<br>O  | 0  | 0  | 0  | 0   | 0  | 0                        | 0<br>0<br>0<br>0   |                    |
| Engineering   | A<br>A<br>A              | C<br>O<br>C<br>O  | 0  | 0  | 0  | 0   | 0  | 0                        | 0<br>0<br>0<br>0   |                    |
| Engineering Training  | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0  | 0  | 0  | 0   | 0  | 0                        | 0<br>0<br>0<br>0<br>0  |                    |
| Engineering Training Outreach   | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0  | 0  | 0  | 0   | 0  | 0                        | 0<br>0<br>0<br>0<br>0  |                    |
| Engineering Training  Outreach Outreach   | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   |  |  |  |   |  |                          | 0<br>0<br>0<br>0<br>0  |                    |
| Engineering Training Outreach   | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0<br>315<br>315  | 0<br>1,755<br>1,755  | 2,090<br>2,090   | 510<br>510  | 0  |                          | 0<br>0<br>0<br>0<br>0  |                    |
| Engineering Training  Outreach Outreach GRAND TOTALS  | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 315  | 1,755  | 2,090  | 510   | 0  | 0                        | 0<br>0<br>0<br>0<br>0<br>0<br>0  |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS A TOTAL   | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 315<br>315   | 1,755<br>1,755   | 2,090<br>2,090   | 510<br>510  | 0  | 0                        | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>4,670                              |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS  A TOTAL  B TOTAL  C TOTAL  SUMMARY OF ATLAS  | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 315<br>315<br>0  | 1,755<br>1,755<br>0  | 2,090<br>2,090<br>0  | 510<br>510<br>0   | 0 0 0  | 0<br>0<br>0              | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>4,670                              |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS MAGNETS PER TYPE                                       | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 315<br>315<br>0  | 1,755<br>1,755<br>0  | 2,090<br>2,090<br>0  | 510<br>510<br>0   | 0 0 0  | 0<br>0<br>0              | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>4,670                              |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS  A TOTAL  B TOTAL  C TOTAL  SUMMARY OF ATLAS  | A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 315<br>315<br>0  | 1,755<br>1,755<br>0<br>0   | 2,090<br>2,090<br>0<br>0   | 510<br>510<br>0   | 0 0 0 0                                      | 0<br>0<br>0<br>0         | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>0<br>0                             |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS  A TOTAL  B TOTAL  C TOTAL  SUMMARY OF ATLAS  MAGNETS PER TYPE  Magnets                         | A<br>A<br>A<br>A<br>Type | C O C C C C   | 315<br>315<br>0<br>0                                       | 1,755<br>1,755<br>0<br>0   | 2,090<br>2,090<br>0<br>0   | 510<br>510<br>0<br>0                                    | 0<br>0<br>0<br>0                             | 0<br>0<br>0<br>0         | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>0<br>0                                  |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS MAGNETS PER TYPE                                       | A<br>A<br>A<br>A<br>Type | C O C C O C C   | 315<br>315<br>0<br>0                                       | 1,755<br>1,755<br>0<br>0   | 2,090<br>2,090<br>0<br>0<br>2004<br>60                             | 510<br>510<br>0<br>0                                    | 0<br>0<br>0<br>0                             | 0<br>0<br>0<br>0         | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>0<br>0                                       |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS  A TOTAL  B TOTAL  C TOTAL  SUMMARY OF ATLAS  MAGNETS PER TYPE  Magnets                         | A<br>A<br>A<br>A<br>Type | C O C C C C   | 315<br>315<br>0<br>0                                       | 1,755<br>1,755<br>0<br>0   | 2,090<br>2,090<br>0<br>0   | 510<br>510<br>0<br>0                                    | 0<br>0<br>0<br>0                             | 0<br>0<br>0<br>0         | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>0<br>0                                  |                    |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS  A TOTAL  B TOTAL  C TOTAL  SUMMARY OF ATLAS  MAGNETS PER TYPE  Magnets  Mechanics  Electronics | A<br>A<br>A<br>A<br>Type | C O C C O C C O C C   | 315<br>315<br>0<br>0<br>2002<br>60<br>25<br>150<br>30      | 1,755<br>1,755<br>0<br>0<br>2003<br>60<br>25<br>150<br>45        | 2,090<br>2,090<br>0<br>0<br>2004<br>60<br>25<br>150<br>50          | 510<br>510<br>0<br>0<br>2005<br>0<br>0                  | 0<br>0<br>0<br>0<br>0<br>2006<br>0<br>0      | 0<br>0<br>0<br>0<br>0    | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>4,670<br>0<br>0<br>0                         | Incl. Gen services |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS MAGNETS PER TYPE  Magnets  Mechanics                   | A<br>A<br>A<br>A<br>Type | C O C C C O C C C O C C C O C C C O C C C O C C C O C C C C O C C C C O C | 315<br>315<br>0<br>0<br>2002<br>60<br>25<br>150<br>30<br>0 | 1,755<br>1,755<br>0<br>0<br>2003<br>60<br>25<br>150<br>45<br>905 | 2,090<br>2,090<br>0<br>0<br>2004<br>60<br>25<br>150<br>50<br>1,160 | 510<br>510<br>0<br>0<br>2005<br>0<br>0<br>0<br>0<br>400 | 0<br>0<br>0<br>0<br>0<br>2006<br>0<br>0<br>0 | 0<br>0<br>0<br>0<br>2007 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>4,670<br>0<br>0<br>75<br>450<br>125<br>2,465 | Incl. Gen services |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS  A TOTAL  B TOTAL  C TOTAL  SUMMARY OF ATLAS  MAGNETS PER TYPE  Magnets  Mechanics  Electronics | A<br>A<br>A<br>A<br>Type | C O C C O C C O C C   | 315<br>315<br>0<br>0<br>2002<br>60<br>25<br>150<br>30      | 1,755<br>1,755<br>0<br>0<br>2003<br>60<br>25<br>150<br>45        | 2,090<br>2,090<br>0<br>0<br>2004<br>60<br>25<br>150<br>50          | 510<br>510<br>0<br>0<br>2005<br>0<br>0                  | 0<br>0<br>0<br>0<br>0<br>2006<br>0<br>0      | 0<br>0<br>0<br>0<br>0    | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>4,670<br>4,670<br>0<br>0<br>0                         | Incl. Gen services |

## M&O Cost Estimates in kCHF

#### ATLAS C&I ESTIMATES (kCHF) FOR TDAQ

M=Maintenance/Repairs

O=Operations

EP-ATO/mn/300102 2002 2003 2004 2005 2006 2007 TOTAL Notes 100 510 0 Detector related costs Dummy C 0 Dummy Α O 0 C 0 Magnet power supply O 0 C 0 ō Gas systems 0 C 0 Gas consumption O 0 Cooling systems o 0 Cooling fluids(above -50°C) 0 External cryogenics O 0 C 0 Proximity cryogenics O 0 C 0 Cryogenic fluids (below –50°C) A ō 0 C 0 Moving/hydraulic systems O Detector safety systems O Detector-specific radiation  $^{\rm o}$ 0 protection C 0 Shutdown activities O 0 0 C Detector (re-)integration & O 0 Α survey General Technical support O 100 510 610 5% of ROBs&infra. Cables, connectors from stores UPS maintenance O C 0 Electronics pool rentals O 0 Α C 0 Beam pipe & vacuum O 0 C 0 Counting & control rooms 0 O 0  $\mathbf{C}$ Α Secretariat Тур 0 Secretarial assistance O 0 Α C 0 Economat O 0 Α C 0 Fax, photocopiers, printers O 0 C 0 Printing and publication 0 O Communications Туре GSM phones O 0 Α 0 GSM phones В O 0 В C 0 Automatic call-back 0 0 C 0 Α Automatic call-back В o 0 В 0 On-line computing Туре System management  $^{\rm o}$ 0 0 Data storage, (temporary on O Α 0 disk) 0 C Detector controls O 0 Computers/processors/LANs o Software licenses

| Common desktop infrastructure      | -<br>A         | О      |   |   |   |   |   |     | 0 |
|------------------------------------|----------------|--------|---|---|---|---|---|-----|---|
|                                    | _<br>_A        | С      |   |   |   |   |   |     | 0 |
| Test beams, calibration facilities | Туре           |        | 0 | 0 | 0 | 0 | 0 | 0   | 0 |
| General operation                  | _<br>_A        | О      |   |   |   |   |   |     | 0 |
| Common electronics                 | A<br>A         | C<br>O |   |   |   |   |   |     | 0 |
| Electronics and DAQ                | _A<br>B        | C<br>O |   |   |   |   |   |     | 0 |
| Counting & control rooms           | B<br>A         | C<br>O |   |   |   |   |   |     | 0 |
| Gas systems                        | A<br>A         | C<br>O |   |   |   |   |   |     | 0 |
| Gas consumption                    | A<br>A         | C<br>O |   |   |   |   |   |     | 0 |
| Gas systems                        | A<br>B         | C<br>O |   |   |   |   |   |     | 0 |
| Gas consumption                    | _B<br>_B<br>_B | C<br>O |   |   |   |   |   |     | 0 |
| External cryogenics                | B<br>B<br>A    | C<br>O |   |   |   |   |   |     | 0 |
|                                    | A              | C      |   |   |   |   |   |     | 0 |
| Proximity cryogenics               | _A<br>_A       | O<br>C |   |   |   |   |   |     | 0 |
| Safety & radioprotection           | _A<br>_A       | O<br>C |   |   |   |   |   |     | 0 |
| Irradiations                       | _B<br>_B       | O<br>C |   |   |   |   |   |     | 0 |
| Modifications                      | _A<br>A        | O<br>C |   |   |   |   |   |     | 0 |
| Modifications                      | B<br>B         | O<br>C |   |   |   |   |   |     | 0 |
| Electronics pool rentals           | A<br>A         | O<br>C |   |   |   |   |   |     | 0 |
| Electronics pool rentals           | _B<br>_B       | O<br>C |   |   |   |   |   |     | 0 |
| Laboratory operations              | Туре           |        | 0 | 0 | 0 | 0 | 0 | 0   | 0 |
| Assembly areas, clean rooms,       | -<br>A         | 0      |   |   |   |   |   | - 0 | 0 |
| active storage areas               | _              | С      |   |   |   |   |   |     |   |
| Assembly areas, clean rooms,       | _A<br>B        | o      |   |   |   |   |   |     | 0 |
| active storage areas               | В              | C      |   |   |   |   |   |     | 0 |
| Workshops                          | _A<br>_A       | O<br>C |   |   |   |   |   |     | 0 |
| Workshops                          | B<br>B         | O<br>C |   |   |   |   |   |     | 0 |
| Laboratory instruments             | _A<br>_A       | O<br>C |   |   |   |   |   |     | 0 |
| Laboratory instruments             | B<br>B         | O<br>C |   |   |   |   |   |     | 0 |
| Electronics pool rentals           | A<br>A         | O<br>C |   |   |   |   |   |     | 0 |
| Electronics pool rentals           | B<br>B         | O<br>C |   |   |   |   |   |     | 0 |
| General services                   | Туре           |        | 0 | 0 | 0 | 0 | 0 | 0   | 0 |
| Cooling & ventilation              | -<br>A         | 0      |   |   |   |   |   |     | 0 |
| Power                              | A<br>A         | C<br>O |   |   |   |   |   |     | 0 |
| Power distribution system          | A<br>A         | C<br>O |   |   |   |   |   |     | 0 |
|                                    | A<br>A         | C<br>O |   |   |   |   |   |     | 0 |
| Heavy transport                    | A              | C      |   |   |   |   |   |     | 0 |
| Cranes                             | _A<br>_A       | O<br>C |   |   |   |   |   |     | 0 |
| Cars                               | _ A<br>_ A     | O<br>C |   |   |   |   |   |     | 0 |
| Cars                               | B<br>B         | O<br>C |   |   |   |   |   |     | 0 |
| Safety & radioprotection           | _C<br>_C       | O<br>C |   |   |   |   |   |     | 0 |
| INB compliance                     | C<br>C         | O<br>C |   |   |   |   |   |     | 0 |
| Radioactive waste disposal         | _C<br>C        | O<br>C |   |   |   |   |   |     | 0 |
| Access system                      | _C<br>_C       | O<br>C |   |   |   |   |   |     | 0 |
|                                    |                |        |   |   |   |   |   |     |   |

| Elevators   | C                             | 0   |                       |                       |   |   |                       |                       | 0   |
|---|-------------------------------|---|-----------------------|-----------------------|---|---|-----------------------|-----------------------|---|
| Gerant de site  | C<br>C                        | C<br>O  |                       |                       |   |   |                       |                       | 0   |
| Flood control   | C<br>C                        | C<br>O  |                       |                       |   |   |                       |                       | 0   |
| Insurance (CERN standard)   | C<br>C                        | C<br>O  |                       |                       |   |   |                       |                       | 0   |
| Cleaning  | C<br>A                        | C<br>O  |                       |                       |   |   |                       |                       | 0   |
|   | A                             | C   |                       |                       |   |   |                       |                       | 0   |
| Cleaning  | C                             | O<br>C  |                       |                       |   |   |                       |                       | 0   |
| Survey  | A                             | o   |                       |                       |   |   |                       |                       | 0   |
|   | A                             | C   |                       |                       |   |   |                       |                       | 0   |
| Survey  | В                             | 0   |                       |                       |   |   |                       |                       | 0   |
| Passive storage space   | B<br>A                        | C<br>O  |                       |                       |   |   |                       |                       | 0   |
| 1 assive storage space  | A                             | C   |                       |                       |   |   |                       |                       | 0   |
| Passive storage space   | В                             | O   |                       |                       |   |   |                       |                       | 0   |
|   | В                             | C   |                       |                       |   |   |                       |                       | 0   |
| Common desktop infrastructure   | A                             | О   |                       |                       |   |   |                       |                       | 0   |
|   | A                             | C   |                       |                       |   |   |                       |                       | 0   |
| Office space  | C<br>C                        | O<br>C  |                       |                       |   |   |                       |                       | 0   |
| Consultancy   | Туре                          |   | 0                     | 0                     | 0   | 0   | 0                     | 0                     | 0   |
|   |                               |   |                       |                       |   |   |                       |                       |   |
| Reviewing   | A                             | О   |                       |                       |   |   |                       |                       | 0   |
|   | A                             | C   |                       |                       |   |   |                       |                       | 0   |
| Reviewing  Engineering  | A<br>A                        | C<br>O  |                       |                       |   |   |                       |                       | 0<br>0  |
| Engineering   | A<br>A<br>A                   | C<br>O<br>C   |                       |                       |   |   |                       |                       | 0<br>0<br>0   |
|   | A<br>A                        | C<br>O  |                       |                       |   |   |                       |                       | 0<br>0  |
| Engineering   | A<br>A<br>A                   | C<br>O<br>C<br>O  | 0                     | 0                     | 0   | 0   | 0                     | 0                     | 0<br>0<br>0<br>0  |
| Engineering Training  Outreach  | A<br>A<br>A<br>A              | C<br>O<br>C<br>O<br>C   | 0                     | 0                     | 0   | 0   | 0                     | 0                     | 0<br>0<br>0<br>0<br>0   |
| Engineering Training  | A<br>A<br>A<br>A<br>A         | C<br>O<br>C<br>O  | 0                     | 0                     | 0   | 0   | 0                     | 0                     | 0<br>0<br>0<br>0  |
| Engineering Training  Outreach  | A<br>A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0                     | 0                     | 0   | 510   | 0                     | 0                     | 0<br>0<br>0<br>0<br>0   |
| Engineering Training  Outreach Outreach GRAND TOTALS A TOTAL  | A<br>A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0                     | 0 0                   | 100<br>100                                    | <i>510</i><br>510                             | 0 0                   | 0                     | 0<br>0<br>0<br>0<br>0   |
| Engineering Training  Outreach Outreach  GRAND TOTALS A TOTAL B TOTAL   | A<br>A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0<br>0<br>0           | 0 0                   | 100<br>100<br>0                               | 510<br>510<br>0                               | 0<br>0<br>0           | 0<br>0<br>0           | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| Engineering Training  Outreach Outreach GRAND TOTALS A TOTAL  | A<br>A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0                     | 0 0                   | 100<br>100                                    | <i>510</i><br>510                             | 0 0                   | 0                     | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0  |
| Engineering Training  Outreach  Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS   | A<br>A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0<br>0<br>0           | 0 0                   | 100<br>100<br>0                               | 510<br>510<br>0                               | 0<br>0<br>0           | 0<br>0<br>0           | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| Engineering Training  Outreach  Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL  | A<br>A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0<br>0<br>0           | 0<br>0<br>0<br>0      | 100<br>100<br>0                               | 510<br>510<br>0<br>0                          | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                          |
| Engineering Training  Outreach Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS TDAQ PER TYPE  TDAQ                                | A<br>A<br>A<br>A<br>A<br>Type | C O C C C   | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0      | 100<br>100<br>0<br>0                          | 510<br>510<br>0<br>0                          | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>610<br>0<br>0                             |
| Engineering Training  Outreach  Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS TDAQ PER TYPE                                     | A<br>A<br>A<br>A<br>A<br>Type | C<br>O<br>C<br>O<br>C   | 0<br>0<br>0           | 0<br>0<br>0<br>0      | 100<br>100<br>0                               | 510<br>510<br>0<br>0                          | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                          |
| Engineering Training  Outreach Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS TDAQ PER TYPE  TDAQ                                | A<br>A<br>A<br>A<br>A<br>Type | C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C C O C C C O C C C O C | 0<br>0<br>0<br>0<br>0 | 0<br>0<br>0<br>0      | 100<br>100<br>0<br>0                          | 510<br>510<br>0<br>0                          | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>610<br>0<br>0                                  |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS  A TOTAL  B TOTAL  C TOTAL  SUMMARY OF ATLAS  TDAQ PER TYPE  TDAQ  Mechanics  Electronics | A<br>A<br>A<br>A<br>A<br>Type | C O C C O C C C C C C C C C C C C C C C   | 0<br>0<br>0<br>0<br>0 | 0<br>0<br>0<br>0<br>0 | 100<br>100<br>0<br>0<br>2004<br>0<br>100<br>0 | 510<br>510<br>0<br>0<br>2005<br>0<br>510<br>0 | 0<br>0<br>0<br>0<br>0 | 0<br>0<br>0<br>0<br>0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>610<br>0<br>0                                  |
| Engineering  Training  Outreach  Outreach  GRAND TOTALS A TOTAL B TOTAL C TOTAL SUMMARY OF ATLAS TDAQ PER TYPE  TDAQ  Mechanics                   | A<br>A<br>A<br>A<br>A<br>Type | C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C O C C C O C C C O C C C O C | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0<br>0 | 100<br>100<br>0<br>0                          | 510<br>510<br>0<br>0<br>2005<br>0<br>510<br>0 | 0<br>0<br>0<br>0<br>0 | 0<br>0<br>0<br>0<br>0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>610<br>0                                  |

#### ATLAS C&I ESTIMATES (kCHF) FOR TECH. COORD & GENERAL

C&I Cost Estimates in kCHF M=Maintenance/Repairs O=Operations

C=Consumables

| C=Consumables<br>EP-ATO/mn/070302   |   |   |     |     |     | 2005 | 2006 |   | TOTAL   | Notes   |
|---|---|---|-----|-----|-----|------|------|---|---|---------|
| Detector related costs  | Туре  |   | 400 | 600 | 945 | 945  | 0    | 0 | 2,890   |         |
| Magnet  | _A  | O   |     |     |     |      |      |   | 0   |         |
| Magnet controls   | _A<br>A   | C<br>O  |     |     |     |      |      |   | 0   |         |
|   | A   | C   |     |     |     |      |      |   | 0   |         |
| Magnet power supply   | _A<br>A   | O<br>C  |     |     |     |      |      |   | 0   |         |
| Gas systems   | A   | 0   |     |     |     |      |      |   | 0   |         |
| Gas consumption   | _A<br>A   | C<br>O  |     |     |     |      |      |   | 0   |         |
|   | A   | C   |     |     |     |      |      |   | 0   |         |
| Cooling systems   | _A<br>A   | O<br>C  |     |     |     |      |      |   | 0   |         |
| Cooling fluids(above –50°C)   | A<br>A  | O<br>C  |     |     |     |      |      |   | 0   |         |
| External cryogenics   | A<br>A  | o   |     |     |     |      |      |   | 0   |         |
| Proximity cryogenics  | _A<br>A   | C<br>O  |     |     |     |      |      |   | 0   |         |
|   | _A<br>_A  | C   |     |     |     |      |      |   | 0   |         |
| Cryogenic fluids (below –50°C)  | _A<br>A   | O<br>C  |     |     |     |      |      |   | 0   |         |
| Moving/hydraulic systems  | _A<br>_A  | O   |     |     |     |      |      |   | 0   |         |
| Data atom cofety avietems   | _A  | C<br>O  |     |     |     |      |      |   | 0   |         |
| Detector safety systems   | _A<br>A   | C   |     |     |     |      |      |   | 0   |         |
| Detector-specific radiation   | A   | O   |     |     |     |      |      |   | 0   |         |
| protection  | A   | C   |     |     |     |      |      |   | 0   |         |
| Shutdown activities   | A   | O   |     |     |     |      |      |   | 0   |         |
| Detector (re-)integration &   | _A<br>A   | C<br>O  | 200 | 300 | 500 | 500  |      |   | 1 500   | Designo |
| survey  | _   |   | 200 | 200 | 200 | 500  |      |   | 1,500   | 2031511 |
| General Technical support   | _A<br>A   | C<br>O  | 160 | 240 | 320 | 320  |      |   | 1 040   | Technic |
|   | _A  | C   | 40  | 60  | 125 | 125  |      |   | 350   | Materia |
| UPS maintenance   | _A<br>A   | O<br>C  |     |     |     |      |      |   | 0   |         |
| Electronics pool rentals  | _   | o   |     |     |     |      |      |   | 0   |         |
| Electronics poor rentals  | A   |   |     |     |     |      |      |   |   |         |
|   | A   | C   |     |     |     |      |      |   | 0   |         |
| Beam pipe & vacuum  | _   |   |     |     |     |      |      |   | 0<br>0<br>0   |         |
|   | A<br>A<br>A                                       | C<br>O<br>C<br>O  |     |     |     |      |      |   | 0 0   |         |
| Beam pipe & vacuum  Counting & control rooms  | A<br>A<br>A<br>A<br>A                             | C<br>O<br>C   |     |     |     |      |      |   | 0<br>0<br>0<br>0  | _       |
| Beam pipe & vacuum  | A<br>A<br>A                                       | C<br>O<br>C<br>O  | 0   | 0   | 0   | 0    | 0    | 0 | 0 0   | _       |
| Beam pipe & vacuum  Counting & control rooms  | A<br>A<br>A<br>A<br>A<br>Type                     | C<br>O<br>C<br>O<br>C   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0  | I       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance   | A<br>A<br>A<br>A<br>A<br>                         | C<br>O<br>C<br>O<br>C   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0  | I       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat   | A<br>A<br>A<br>A<br>A<br>Type                     | C<br>O<br>C<br>O<br>C   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0  | I       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance   | A<br>_A<br>_A<br>_A<br>A<br>A<br>A<br>A<br>A<br>A | C O C O C O C   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0  | I       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  |   | C O C O C O C C   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0   | I       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat   | A<br>_A<br>_A<br>_A<br>A<br>A<br>A<br>A<br>A<br>A | C O C O C O C   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0  | I       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  |   | C O C O C O C O O C   | 0   | 0   | 0   | 0    | 0    |   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                               |         |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  | Type  A A A A A A A A A A A A A A A A A A         | C O C O C O C C O C C   |     |     |     |      |      |   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                     | I<br>I  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  |   | C O C O C O C O O C   |     |     |     |      |      |   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                               | I<br>I  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  |   | C O C O C O C O C O C O C O C O C O C O   |     |     |     |      |      |   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | ī<br>I  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  |   | C O C O C O C O C O C C C O C C C O C C C O C C C O C |     |     |     |      |      |   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                | ī<br>I  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back   |   | C O C O C O C C C O C C C C O C C C C O C C C C O C C C C C O C   |     |     |     |      |      |   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | I<br>I  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  |   | C O C O C O C O C O C O C O C O C O C O   |     |     |     |      |      |   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | ]       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back  Automatic call-back  |   | C O C O C O C C C O C C C C O C C C C O C C C C O C C C C C O C   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | [       |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back   |   | C O C O C O C O C O C O C O C O C O C O   |     |     |     |      | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | ]<br>]  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back  Automatic call-back  |   | C O C O C O C O C O C O C O C O C O C O   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | ]<br>]  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  Automatic call-back  Automatic call-back  On-line computing  System management  |   |   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | ]<br>]  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back  Automatic call-back  |   |   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |         |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back  Automatic call-back  On-line computing  System management  Data storage, (temporary on disk)                                 |   |   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | ]<br>]  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back  Automatic call-back  On-line computing  System management  Data storage, (temporary on disk)  Detector controls |   |   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | ]<br>[  |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back  Automatic call-back  On-line computing  System management  Data storage, (temporary on disk)                                 |   |   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |         |
| Beam pipe & vacuum  Counting & control rooms  Secretariat  Secretarial assistance  Economat  Fax, photocopiers, printers  Printing and publication  Communications  GSM phones  GSM phones  Automatic call-back  Automatic call-back  On-line computing  System management  Data storage, (temporary on disk)  Detector controls              |   |   | 0   | 0   | 0   | 0    | 0    | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |         |

| Common desktop infrastructure   | A  | O                                       |     |     |     |     |   |        | 0   |
|---|--|---|-----|-----|-----|-----|---|--------|---|
|   | A  | C                                       | 30  | 30  | 30  |     |   | ģ      | 90  |
| Test beams, calibration facilities  | Туре   |   | 0   | 0   | 0   | 0   | 0 | 0      | 0   |
| General operation   | A  | 0                                       |     |     |     |     |   |        | 0   |
| Common electronics  | _A<br>_A   | C<br>O                                  |     |     |     |     |   |        | 0   |
| Electronics and DAQ   | _A<br>B  | C<br>O                                  |     |     |     |     |   |        | 0   |
| Counting & control rooms  | _B<br>A  | C<br>O                                  |     |     |     |     |   |        | 0   |
| Gas systems   | A<br>A   | C<br>O                                  |     |     |     |     |   |        | 0   |
| Gas consumption   | _A<br>A  | C<br>O                                  |     |     |     |     |   |        | 0   |
| Gas systems   | _A<br>B  | C<br>O                                  |     |     |     |     |   |        | 0   |
|   | В  | C                                       |     |     |     |     |   |        | 0   |
| Gas consumption   | _B<br>_B   | O<br>C                                  |     |     |     |     |   |        | 0   |
| External cryogenics   | A<br>A   | O<br>C                                  |     |     |     |     |   |        | 0   |
| Proximity cryogenics  | _A<br>A  | O<br>C                                  |     |     |     |     |   |        | 0   |
| Safety & radioprotection  | A<br>A   | O<br>C                                  |     |     |     |     |   |        | 0   |
| Irradiations  | В  | O                                       |     |     |     |     |   |        | 0   |
| Modifications   | _B<br>_A   | C<br>O                                  |     |     |     |     |   |        | 0   |
| Modifications   | _A<br>_B   | C<br>O                                  |     |     |     |     |   |        | 0   |
| Electronics pool rentals  | _B<br>A  | C<br>O                                  |     |     |     |     |   |        | 0   |
| Electronics pool rentals  | A<br>B   | C<br>O                                  |     |     |     |     |   |        | 0   |
|   | B  | C                                       |     |     |     |     |   |        | 0   |
| Laboratory operations   | Туре   |   | 0   | 0   | 0   | 0   | 0 | 0      | 0   |
| A1.11   | _<br>A   | О                                       |     |     |     |     |   |        |   |
| Assembly areas, clean rooms,  | 11   | O                                       |     |     |     |     |   |        | 0   |
| active storage areas  | A  | С                                       |     |     |     |     |   |        | 0   |
|   | _  | C<br>O                                  |     |     |     |     |   |        |   |
| Assembly areas, clean rooms, active storage areas   | A  | С                                       |     |     |     |     |   |        | 0   |
| Assembly areas, clean rooms, active storage areas  Workshops  | A<br>B<br>B<br>A<br>A  | C<br>O<br>C<br>O<br>C                   |     |     |     |     |   |        | 0<br>0<br>0<br>0<br>0   |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops   | A<br>B<br>B<br>A<br>A<br>B<br>B  | C O C O C                               |     |     |     |     |   |        | 0<br>0<br>0<br>0<br>0<br>0  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments   | A<br>B<br>B<br>A<br>A<br>B<br>B<br>A   | C O C O C O C                           |     |     |     |     |   |        | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops   | A<br>B<br>B<br>A<br>A<br>B<br>B<br>B   | C O C O C O C C O C C                   |     |     |     |     |   |        | 0<br>0<br>0<br>0<br>0<br>0<br>0   |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments   | A<br>B<br>B<br>A<br>A<br>B<br>B<br>A<br>A  | C O C O C C O C C O C O C O C O C O C O |     |     |     |     |   |        | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0  |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments   | A B A A B B A A  | C O C O C O C O C O C O C O C O C O C O |     |     |     |     |   |        | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                                    |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals   | A B A A B B A A  | C O C O C C O C C C O C C               | 120 | 390 | 740 | 550 | 0 | 0 18   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| active storage areas  Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals   | A BBBAA BBBBB  | C O C O C O C O C C O C                 | 120 | 390 | 740 | 550 | 0 | 0 1,80 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| active storage areas  Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  General services  Cooling & ventilation  | A BBAAB BBAAB BBAAB BBAABBAAA              | C O C O C O C O C O C O C O C O C O C O | 120 | 390 | 740 | 550 | 0 | 0 1,80 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| active storage areas  Assembly areas, clean rooms, active storage areas  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  | A BBBAAB BBBBBBBBBBBBBBBBBBBBBBBBBBBBBAAA  | C O C O C O C O C O C O C O C O C O C O | 120 | 390 | 740 | 550 | 0 | 0 1,80 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| active storage areas  Assembly areas, clean rooms, active storage areas  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  General services  Cooling & ventilation  Power  Power distribution system   | A B B A A B B A A  | C O C O C O C O C O C O C O C O C O C O | 120 | 390 | 740 | 550 | 0 |        | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| active storage areas  Assembly areas, clean rooms, active storage areas  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  General services  Cooling & ventilation   | A BBBAAB BB BBAAB BB BB AAAB BB AA | C O C O C O C O C O C O C O C O C O C O | 120 | 390 | 740 | 550 | 0 |        | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| active storage areas  Assembly areas, clean rooms, active storage areas  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  General services  Cooling & ventilation  Power  Power distribution system   | A BBBAABB  |   | 120 |     |     |     | 0 | 78     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport   | A BBBBBBB  |   |     | 90  | 440 | 250 | 0 | 78     | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes   | A BBBAAAA  |   |     | 90  | 440 | 250 | 0 | 78     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars   | A BBBAAAA  |   |     | 90  | 440 | 250 | 0 | 78     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Electronics pool rentals  Oooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars   | A BBBBBBB  |   |     | 90  | 440 | 250 | 0 | 78     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars  Safety & radioprotection  INB compliance | A BBBBBBB  |   |     | 90  | 440 | 250 | 0 | 78     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Assembly areas, clean rooms, active storage areas  Workshops  Workshops  Laboratory instruments  Laboratory instruments  Electronics pool rentals  Electronics pool rentals  Cooling & ventilation  Power  Power distribution system  Heavy transport  Cranes  Cars  Cars  Safety & radioprotection           | A BBBBBBB  |   |     | 90  | 440 | 250 | 0 | 78     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |

| Elevators                     | _C      | 0      |     |       |       |       |   |   | 0     |
|-------------------------------|---------|--------|-----|-------|-------|-------|---|---|-------|
| Count to site                 | _C<br>C | C<br>O |     |       |       |       |   |   | 0     |
| Gerant de site                | _C      | C      |     |       |       |       |   |   | 0     |
| Flood control                 | _C      | 0      |     |       |       |       |   |   | 0     |
| Plood Collifor                | _C      | C      |     |       |       |       |   |   | 0     |
| Insurance (CERN standard)     | _C      | 0      |     |       |       |       |   |   | 0     |
| msurance (CERT standard)      | -C      | Č      |     |       |       |       |   |   | 0     |
| Cleaning                      | -A      | Ö      |     |       |       |       |   |   | 0     |
| Cleaning                      | A A     | Č      |     |       |       |       |   |   | 0     |
| Cleaning                      | C       | Ö      |     |       |       |       |   |   | 0     |
| Cleaning                      | -c      | Č      |     |       |       |       |   |   | 0     |
| Survey                        | A       | Ö      |     |       |       |       |   |   | 0     |
| <u>Survey</u>                 | A       | Č      |     |       |       |       |   |   | 0     |
| Survey                        | В       | Ö      |     |       |       |       |   |   | 0     |
|                               | В       | Č      |     |       |       |       |   |   | 0     |
| Passive storage space         | A       | O      |     |       |       |       |   |   | 0     |
|                               | A       | C      |     |       |       |       |   |   | 0     |
| Passive storage space         | В       | O      |     |       |       |       |   |   | 0     |
|                               | В       | C      |     |       |       |       |   |   | 0     |
| Common desktop infrastructure | A       | O      |     |       |       |       |   |   | 0     |
|                               |         |        |     |       |       |       |   |   | 0     |
| 0.66                          | _A<br>C | C      |     |       |       |       |   |   | 0     |
| Office space                  | _C      | O<br>C |     |       |       |       |   |   | 0     |
|                               |         | C      |     |       |       |       |   |   | U     |
| Consultancy                   | Туре    |        | 0   | 0     | 0     | 0     | 0 | 0 | 0     |
| Reviewing                     | A       | О      |     |       |       |       |   |   | 0     |
|                               | A       | C      |     |       |       |       |   |   | 0     |
| Engineering                   | A       | O      |     |       |       |       |   |   | 0     |
|                               | A       | C      |     |       |       |       |   |   | 0     |
| Training                      | A       | O      |     |       |       |       |   |   | 0     |
|                               | _A      | C      |     |       |       |       |   |   | 0     |
| Outreach                      | Туре    |        | 0   | 0     | 0     | 0     | 0 | 0 | 0     |
| Outreach                      | A       | O      |     |       |       |       |   |   | 0     |
| Guadadii                      | A       | C      |     |       |       |       |   |   | 0     |
| GRAND TOTALS                  |         |        | 550 | 1,020 | 1,715 | 1,495 | 0 | 0 | 4,780 |
| A TOTAL                       |         |        | 550 | 1,020 | 1,715 | 1,495 | 0 | 0 | 4,780 |
| B TOTAL                       |         |        | 0   | 0     | 0     | 0     | 0 | 0 | 0     |
| C TOTAL                       |         |        | 0   | 0     | 0     | 0     | 0 | 0 | 0     |
|                               |         |        |     |       |       |       |   |   |       |

# SUMMARY OF ATLAS TECHNICAL COORD. PER

| TYPE<br>TCn & General |  |
|-----------------------|--|
| Mechanics             |  |
| Electronics           |  |

Cryogenics TOTALS

|   | 2002 | 2003  | 2004  | 2005  | 2006 | 2007 | Total |
|---|------|-------|-------|-------|------|------|-------|
| O | 480  | 930   | 1,560 | 1,370 | 0    | 0    | 4,340 |
| C | 40   | 60    | 125   | 125   | 0    | 0    | 350   |
| O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |
| C | 30   | 30    | 30    | 0     | 0    | 0    | 90    |
| O | 0    | 0     | 0     | 0     | 0    | 0    | 0     |
| C | 0    | 0     | 0     | 0     | 0    | 0    | 0     |
|   | 550  | 1.020 | 1.715 | 1.495 | 0    | 0    | 4.780 |

#### 19-Mar-02

### SUMMARY OF C&(B) kCHF

| <b>EXPERIMENT:</b> | ATLAS                             |      |      |      |      |      |      |      |      |      |        |
|--------------------|-----------------------------------|------|------|------|------|------|------|------|------|------|--------|
| Subsystem:         | ID&TileCal&LAr&Muons              | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | TOTALS |
|                    | Mechanics                         | 280  | 415  | 113  | 60   | 0    | 0    | 0    | 0    | 0    | 868    |
|                    | Gas-system                        | 50   | 120  | 245  | 125  | 0    | 0    | 0    | 0    | 0    | 540    |
|                    | Cryo-system                       | 0    | 70   | 70   | 120  | 0    | 0    | 0    | 0    | 0    | 260    |
|                    | Cooling system                    | 40   | 185  | 345  | 275  | 0    | 0    | 0    | 0    | 0    | 845    |
|                    | FE electronics                    | 20   | 50   | 120  | 100  | 0    | 0    | 0    | 0    | 0    | 290    |
|                    | Standard electronics, PS (LV, HV) | 0    | 0    | 70   | 100  | 0    | 0    | 0    | 0    | 0    | 170    |
|                    | Standard electronics, Crates      | 20   | 120  | 230  | 140  | 0    | 0    | 0    | 0    | 0    | 510    |
|                    | Standard electronics, RO Modules  | 0    | 0    | 0    | 30   | 0    | 0    | 0    | 0    | 0    | 30     |
|                    | Controls, (DCS, DSS)              | 30   | 75   | 70   | 25   | 0    | 0    | 0    | 0    | 0    | 200    |
|                    | Sub-Detector Spares               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                    | Areas                             | 472  | 494  | 426  | 265  | 0    | 0    | 0    | 0    | 0    | 1657   |
|                    | Communications                    | 20   | 20   | 20   | 20   | 0    | 0    | 0    | 0    | 0    | 80     |
|                    | Store Items                       | 106  | 209  | 209  | 55   | 0    | 0    | 0    | 0    | 0    | 579    |
|                    | Hired Manpower @ CERN (CHF)       | 965  | 1460 | 1770 | 1185 | 0    | 0    | 0    | 0    | 0    | 5380   |
|                    | Technical Manpower @CERN (FTE)    | 32   | 48   | 40   | 19   | 0    | 0    | 0    | 0    | 0    | 139    |
|                    | TOTALS (excl. FTEs)               | 2003 | 3218 | 3688 | 2500 | 0    | 0    | 0    | 0    | 0    | 11409  |
|                    | Spares paym.advcment profile      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |

7-Mar-02 C&I (B) kCHF

| ERIMENT: ATLAS                      |      |      |      |        |        |        |     |      |      |   |
|-------------------------------------|------|------|------|--------|--------|--------|-----|------|------|---|
| sID                                 | 2002 | 2003 | 2004 | 2005 2 | 2006 2 | 2007 2 | 800 | 2009 | 2010 | TOTALS  |
| Mechanics                           | 20   | 25   | 23   | 10     |        |        |     |      |      | 78 NMR probes for field monitoring  |
| Gas-system                          | 25   | 75   | 100  |        |        |        |     |      |      | 200 Gas for SR; B154  |
| Cryo-system                         |      |      |      |        |        |        |     |      |      | 0   |
| Cooling system                      | 40   | 180  | 280  | 180    |        |        |     |      |      | 680 Fluids, for cooling in assembly setups, SR and during commissioning   |
| FE electronics (spares)             |      |      |      |        |        |        |     |      |      | 0   |
| Standard electronics, PS (LV, HV)   |      |      |      |        |        |        |     |      |      | 0   |
| Standard electronics, Crates        |      |      |      |        |        |        |     |      |      | 0   |
| Standard electronics, RO Modules    |      |      |      |        |        |        |     |      |      | 0   |
| Controls, (DCS, DSS)                | 30   | 25   | 20   | 15     |        |        |     |      |      | 90  |
| Sub-Detector Spares                 |      |      |      |        |        |        |     |      |      | 0   |
| Areas                               |      |      |      |        |        |        |     |      |      | 0   |
| SR-maintenance facility (buildup)   | 238  | 163  | 60   | 60     |        |        |     |      |      | 521 Setup of SR-facility, primary cooling, racks and plumbing for racks, UPS systems, static floor, laser room with ventilation, safety systems, pad for CMM                  |
| SR-maintenance facility (operation) | 234  | 331  | 336  | 205    |        |        |     |      |      | 1106 Pool items, scopes, multimeters, small instruments, cleaning, cleanroom clothing, PCs, DCS and control for cooling and gas, licenses, platforms, tooling and handling er |
| Testbeam and irradiation            |      |      |      |        |        |        |     |      |      | 0   |
| Systemtests                         |      |      |      |        |        |        |     |      |      | 0   |
| Communications                      | 5    | 5    | 5    | 5      |        |        |     |      |      | 20 GSM phones   |
| Store Items                         | 66   | 89   | 89   | 55     |        |        |     |      |      | 299 Store   |
| Hired Manpower @ CERN (CHF)         |      |      |      |        |        |        |     |      |      | 0   |
| Standard tasks                      | 115  | 220  | 270  | 200    |        |        |     |      |      | 805 Manpower for SR and installation, preparation and installation of services, piping and patchpanels, same for gas and cooling systems                                      |
| Special interventions               |      |      |      |        |        |        |     |      |      | 0   |
| Technical Manpower @CERN (FTE)      | 1    | 2    | 3    | 1      |        |        |     |      |      | 7   |
| TOTALS (excl. FTEs)                 | 773  | 1113 | 1183 | 730    | 0      | 0      | 0   | 0    | - (  | 0 3799  |
|                                     |      |      |      |        |        |        |     |      |      |   |
| Spares paym.advcment profile        | 0    | 0    | 0    | 0      | 0      | 0      | 0   | 0    |      | ol ol   |

C&I (B) kCHF

| 0000      | 0000                 | 0004                                | 0005                                     | 0000                                     | 0007                                    | 0000                                     | 0000                                    | 2040                                    | TOTALO           |   |
|-----------|----------------------|-------------------------------------|--|--|---|--|---|---|------------------|---|
| 2002      | 2003                 |                                     |  | 2006                                     | 2007                                    | 2008                                     | 2009                                    | 2010                                    |                  |   |
| 10        | 10                   | 10                                  | 10                                       | 0  |   |  |   |   | 40               | Air pads (services)   |
| إـــــــا |                      |                                     |  |  |   |  |   |   | 0                |   |
|           | 70                   | 70                                  | 120                                      |  |   |  |   |   | 260              | Cryo system B180 (small parts), liquid argon for cold tests of three cryostats  |
|           | 5                    | 5                                   | 5  |  |   |  |   |   | 15               | Cooling power supplies, FE crates   |
|           |                      |                                     |  |  |   |  |   |   | 0                |   |
|           |                      |                                     |  |  |   |  |   |   | 0                |   |
| 20        | 90                   | 90                                  | 100                                      |  |   |  |   |   | 300              | Lab.equipment (DVM's, oscilloscopes,TDRs), tpecial test/measuring devices   |
|           |                      |                                     | 30                                       |  |   |  |   |   | 30               | Programs licences (Labview, DSP programs, compiler,), replacement of in crate comp.hardware                           |
|           |                      |                                     | 10                                       |  |   |  |   |   | 10               | Replacement of components for local DCS (ELMBs,sensors,)  |
|           |                      |                                     |  |  |   |  |   |   | 0                |   |
|           |                      |                                     |  |  |   |  |   |   | 0                |   |
| 5         | 5                    | 5                                   | 5  |  |   |  |   |   | 20               | GSM phones (1 kCHF/FTE/y)   |
| 40        | 120                  | 120                                 |  |  |   |  |   |   | 280              | Stores (sheet metal, elec.components,)  |
| 385       | 335                  | 495                                 | 365                                      |  |   |  |   |   | 1580             | Technicians & welders, C&C technicians included. In 2004, heavy transport in C&I (TCn). Tech. Manpower delegated from |
| 26        | 35                   | 13                                  | 0  |  |   |  |   |   | 74               | Tech. Manpower delegated from LAr institutes for detector integration in B180 & EHN1                                  |
| 460       | 635                  | 795                                 | 645                                      | 0  | 0                                       | 0  | C                                       | (                                       | 0 2535           |   |
|           | 5<br>40<br>385<br>26 | 10 10 70 5 5 5 40 120 385 335 26 35 | 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | 10 10 10 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 10 10 10 10 0 0 10 0 10 0 10 10 10 10 10 | 10 10 10 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 10 10 10 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 10 10 10 10 10 0 | 10 10 10 10 10 0 0 40 0 0 0 0 0 0 0 0 0   |

#### C&I (B) kCHF

| ERIMENT: ATLAS                    |      |      |      |      |      |      |      |      |      |        |  |
|-----------------------------------|------|------|------|------|------|------|------|------|------|--------|--|
| system: Muons                     | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | TOTALS |  |
| Mechanics                         | 0    | 0    | 80   | 40   |      |      |      |      |      | 120    | Survey, tools for transporting                           |
| Gas-system                        | 10   | 30   | 120  | 100  |      |      |      |      |      | 260    | Gases (Ar,C)2,N-Pentane for testing assembled detectors  |
| Cryo-system                       |      |      |      |      |      |      |      |      |      | 0      |  |
| Cooling system                    |      |      | 60   | 90   |      |      |      |      |      | 150    | Operation of assebled detectors. 3% of CORE value        |
| FE electronics                    | 20   | 50   | 120  | 100  |      |      |      |      |      | 290    | Electronics for testing chamber modules                  |
| Standard electronics, PS (LV, HV) |      |      |      |      |      |      |      |      |      | 0      |  |
| Standard electronics, Crates      | 0    | 30   | 140  | 40   |      |      |      |      |      | 210    | Testing eqpm for chambers(scintillators, PMS, R-O)       |
| Standard electronics, RO Modules  |      |      |      |      |      |      |      |      |      | 0      |  |
| Controls, (DCS, DSS)              |      |      |      |      |      |      |      |      |      | 0      |  |
| Sub-Detector Spares               |      |      |      |      |      |      |      |      |      | 0      |  |
| Areas                             |      |      | 30   |      |      |      |      |      |      | 30     | Transport structures for chanbers                        |
| Communications                    | 5    | 5    | 5    | 5    |      |      |      |      |      | 20     | GSM phones   |
| Store Items                       |      |      |      |      |      |      |      |      |      | 0      |  |
| Hired Manpower @ CERN (CHF)       | 205  | 405  | 505  | 120  |      |      |      |      |      | 1235   | Eng. studies, gas system op, integration work, transport |
| Technical Manpower @CERN (FTE)    | 3    | 6    | 19   | 13   |      |      |      |      |      | 41     | Assembly of detectors at CERN                            |
| TOTALS (excl. FTEs)               | 240  | 520  | 1060 | 495  | 0    | 0    | 0    | 0    | 0    | 2315   |  |

#### C&I (B) kCHF

| RIMENT: ATLAS                             |      |      |      |      |      |      |      |      |      |        |  |
|---|------|------|------|------|------|------|------|------|------|--------|--|
| vstem: TileCal                            | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | TOTALS |  |
| Mechanics (incl. optics)                  | 250  | 380  |      |      |      |      |      |      |      | 630    | part of cradle, non magnetc steel saddles cost               |
| Gas-system (Ce-hydraulic drive)           | 15   | 15   | 25   | 25   |      |      |      |      |      | 80     | 1/4 of the full Cs source drive and monitoring systen        |
| Cryo-system                               |      |      |      |      |      |      |      |      |      | 0      |  |
| Cooling system                            |      |      |      |      |      |      |      |      |      | 0      |  |
| FE electronics                            |      |      |      |      |      |      |      |      |      | 0      |  |
| Standard electronics, PS (LV, HV)         |      |      | 70   | 100  |      |      |      |      |      | 170    | 200 V PS to supply LV PS                                     |
| Standard electronics, Crates              |      |      |      |      |      |      |      |      |      | 0      |  |
| Standard electronics, RO Modules          |      |      |      |      |      |      |      |      |      | 0      |  |
| Controls, (DCS, DSS); ELMBs for test-beam |      | 50   | 50   |      |      |      |      |      |      | 100    | Local monitor boards and their motherboards                  |
| Sub-Detector Spares                       |      |      |      |      |      |      |      |      |      | 0      |  |
| Areas                                     |      |      |      |      |      |      |      |      |      | 0      |  |
| Communications                            | 5    | 5    | 5    | 5    |      |      |      |      |      | 20     | videoconferencing, GSM phones                                |
| Store Items                               |      |      |      |      |      |      |      |      |      | 0      |  |
| Hired Manpower @ CERN (CHF)               | 260  | 500  | 500  | 500  |      |      |      |      |      | 1760   | Preassembly and installation manpower:                       |
| Technical Manpower @CERN (FTE)            | 2    | 5    | 5    | 5    | 0    | 0    |      |      |      | 17     | 2 engineers, 6 technitians, 2 surveyors, 1.5 FTE for cooling |
| TOTALS (excl. FTEs)                       | 530  | 950  | 650  | 630  | 0    | 0    | 0    | 0    | C    | 2760   |  |